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THE FUNDAMENTAL FUNCTIONS OF CONSCIOUSNESS.¹

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The recent discussions of fundamental psychological concepts, searching though they have been, seem to have missed a distinction of some importance. The term *function* has not yet been sufficiently defined and is applied at once to two very different sorts of process. I think it can be shown that memory, perception, imagination, and the like, are not operations of *the same order* as association and discrimination, for example, and that to class the two sets together creates confusion in our analysis. A careful distinction between them may throw light on the problem of function versus structure in psychology.

Where introspective analysis has failed, the genetic standpoint, which acts as solvent for more than one perplexing compound, enables the separation to be made, as it has brought to light an analogous distinction among biological functions. In the organic world certain processes are selective adaptations to environment and differ according to the species; others, more fundamental in character, run through the entire range of life and are essential to organic existence itself. Thus, in mankind, the locomotor and prehensile functions of the four limbs, the sudatory function, the circulatory function of the heart, are but particular types of function depending on particular forms of structure, out of many, more or less different, which appear in the various organic species, and which serve equally well to accomplish the biological ends of existence. The general functions of nutrition, reproduction, and defense, which work in many different ways and through many different organs, are operations of another sort altogether. The

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¹ Read in part as a paper before the New York Section of the American Psychological Association, February 26, 1906, under the title, 'A New View of Mental Function.'

former are historic developments, while the latter are fundamental biological functions.

A similar distinction holds in psychology, though the parallel is by no means complete, owing to the different character of the sciences. A comparative study of mind shows that the processes to which, as it happens, most emphasis has been given in introspective psychology are merely special adaptations to the environment in which conscious beings chance to be placed; the same study, carefully followed out, will reveal, I believe, underlying these, certain *fundamental* functions which belong to the nature of mental life and to whose operation every phenomenon of consciousness can be traced. The purpose of the present paper is to distinguish between these two sorts of 'function' and to examine briefly the nature and rôle of the latter.

The usual systematic treatment of psychology lays too much emphasis on the particular senses. The analysis of the qualities, intensities, and mutual relations of sensations, important though it be from the psychophysical standpoint, is not one of the prime questions of psychology proper. That light and sound, for instance, are practically universal features of our physical environment, does not make vision and hearing essential mental functions. Even were these senses universal among conscious beings (which they are not), they could give no clue to the ultimate constitution of 'mentality.' The fact that we have visual and auditory experiences, instead of magnetic and what not, is a matter of psychophysical natural history only. The analytic psychologist should distinguish between the intrinsic characters of consciousness and the special forms and processes which it manifests. In making our analysis of the nature of mind the only questions which bear on sensory experience are, 'How does the mind come to have sensations (when stimuli produce activity in the brain)?' and, 'How do these sensory experiences come to differ (as the modes of stimulation differ)?' The assistance afforded by physiological research is sufficiently acknowledged in the second part of each question, though I believe the psychological investigation can be carried on without it. In any case, the analysis of particular sensation data has no bearing on the problem.

Similarly, the distinction between sensation and memory is solely a question of natural history. Experiences based on the central revival process and experiences based on sense stimulation present no other sort of differences than can be found among the various types of the latter. The gradual passing of sensation through after-image into memory-image, and the notable instances of confusion between sensa-

tions and memories, make it impossible to regard the processes involved as fundamentally different in character. The descriptive treatment of memory seems to belong naturally with sensation, or at least immediately after it—not after perception; the rise of memory requires no new function: simple memory experiences, as psychological data, result from the same sort of operations as sensation experiences.

Nor does the distinction between cognitive, affective, and conative 'sides of consciousness' or any other division along similar lines afford a satisfactory clue to the ultimate mental functions. For, while it may serve to demarcate certain distinctive classes of experience, the processes concerned in the *production* of these data are either psychologically equivalent or they are complex. That such a division does not rest on any *fundamental distinction in mental function* a cursory examination will suffice, I think, to show.

The conative side of consciousness in its simpler forms has been traced to kinæsthetic sensations with accompanying motor phenomena. The latter element is not an experience at all—it is purely physiological. And in the nature of the kinæsthetic sensations there is nothing fundamentally different from other sensations: muscle sensations differ from visual just as visual differ from auditory, if we consider the psychological aspect only. This does not lessen the peculiar importance of conative experience in determining some of the higher forms of consciousness (voluntary attention and voluntary activity); but it points to the need of another starting-point to explain this evolution.

Turning to affective or hedonic consciousness, the line of demarcation between feeling and sensation has never been drawn to the satisfaction of many psychologists, including the present writer. Admitting fully the distinction between physical pain (*Schmerz*) and unpleasantness (*Unlust*), I still cannot see wherein the Lust-Unlust experience itself is essentially different from certain other experiences which are classed as sensations or revivals—for example, the margin of the visual field and the temporal setting of memory-images. Whether the affective datum be regarded as an experience standing by itself (feeling) or as a character of experiences (tone), it is sensory in character: feeling can be attributed to systemic sensations; the hedonic tone of sensations is due to a margin or fringe of systemic sensations, and ideal hedonic tone to a memory fringe of the same sort. The distinction between affective and cognitive phenomena, then, is not psychological, but rests on a difference in the biological data: 'affective stimuli' are physiological processes, 'cognitive stimuli' are aspects of the physical environment.

Having noted the essential similarity of the conative and affective data to the cognitive, it remains to bring out the general relationship of the three. The distinguishing mark of cognition is its presentative nature; and for the most part the senses which offer this characteristic are the 'external' ones. The distinction between cognitive, affective, and conative consciousness can be said, then, to correspond in a general way to the difference between the external, systemic, and kinæsthetic senses: the first give experiences of the outer world; the second keep us in touch with the state of our own organism; the third supply experiences of the motor life and thus form the basis of voluntary activity. Whether I have drawn the limits exactly or not, the three-fold division rests on biological differences; psychologically, the differences separating the three classes of data are similar to other sensation differences; the three classes are therefore not due to the separate operation of three distinct mental functions.

A word is in place here on Brentano's classification, which presents certain distinctive features. In the first place he groups feeling and conation together as phenomena of attraction and repulsion (*Phänomene der Liebe und des Hasses*); and in the second place he introduces a new class in the shape of judgments (*Urtheile*). His basis is the attitude of consciousness towards its objects: the data are either simply presented, or judged (reflected upon), or actively liked or disliked. I have already pointed out that affective and conative phenomena, so far as they are data of consciousness, involve nothing essentially different from presentations, so that I cannot regard his first and third classes as psychologically distinct. But Brentano's arguments for regarding the judgment psychosis as a distinct type of experience appeal to me very strongly, and as a matter of fact have had much to do with developing the view to be presented in the rest of this paper. His chief mistake, which is the mistake of the other classifications as well, is the endeavor to account for *each sort of experience by a single function only*, and to attribute to each function but one sort of experience. Judgment (in Brentano's use of the term) or reflection is concerned in the formation of many different sorts of conscious phenomena—of all, in fact, whose distinguishing feature is conscious discrimination; and in the production of these same phenomena other operations, such as association, are involved as well.

Let me suggest a view aiming to meet this criticism. The fundamental processes or functions of consciousness, as I conceive them, consist of *all radically different operations required to account for*

the particular phenomena of experience;¹ they should be *psychical*, not biological functions nor phenomenon of the material world; and they should together account for all forms of consciousness. From this point of view they need not be each exemplified in a particular phase of consciousness or class of experiences; as a matter of fact they work together in the production of the various sorts of mental states, the different types of coöperation constituting 'functions' in the usual sense of the term. I will mention in turn the functions which seem to fulfill these conditions.

The first to manifest itself in the evolution of consciousness is *Sensibility*, which is the basis of all experience, the operation by which conscious experience is brought about, as distinguished from the mere presence of neural or brain activity in the biological organism. Consciousness as it occurs in the lower organisms is simple. Tracing back the course of mental evolution we come to a point where, to judge from all indications, it is wholly undifferentiated. The physical data at this point are simple contacts of the environment; the resulting experience is a mere *undifferentiated continuum*. This first appearance of consciousness results, as a psychological phenomenon, from the activity of sensibility alone.

Differentiated experience, however simple, requires something more than this. The study of the evolution of consciousness has been hindered by the prominence of the biological processes. We are accustomed to consider each type of experience as something attached to a particular brain center, and to translate the evolution of the former into terms of the latter. But the differentiation of sense organs and of brain centers, the differentiated modes of physiological activity that result, do not accurately represent the differentiation that takes place in consciousness. The latter is a two-fold process, involving two very different functions. Every complex experience is made up of constituent elements which differ either *qualitatively* or *intensively* or both. These two sorts of difference existing among elementary experiences require the operation of two distinct functions: one produces *quality differentiations* of experience, the other *intensity modifications*. These are fundamental functions of consciousness. In the systematic treatment of psychology, whether analytic or genetic, they should be examined at the outset, and their rôle (separate or

¹Cf. article 'Classification' in Baldwin's *Dict. of Philos. and Psychol.* (Vol. I., p. 188), where it is proposed that we treat 'as ultimate only those general modes which are necessary to constitute any and every concrete conscious state.'

joint) in the formation of particular classes of experience should be indicated in the discussion of each class.

The operation of quality differentiation is peculiar, since the quality differences of experiences are something without a counterpart in the physical world. The various sorts of chemical atoms are said to be 'qualitatively different,' and they form compounds which differ in many notable respects from the elements which compose them. But the differences between the elements, and the mutual relations of chemical compounds, can always be expressed in numerical terms of quantity of energy and space relations—the differences in the material world are quantitative, not qualitative. On the other hand, the difference between a sound and a color, as data of experience, has nothing quantitative about it; it is something unique to the world of experience. And the same is true of all sensation qualities. This has been insisted upon by many writers; but the widespread operation of the function in mental life has not been sufficiently recognized. Not a new complex experience arises but entails some qualitative change in the character of the data which compose it. Our state of mind, for instance, when we observe the printed letters *m*, *a*, *n*, side by side, is qualitatively affected by our knowledge of the English language; our perception of the letter *m* is something qualitatively different from the experience of an illiterate person viewing this same ink-impression on the paper; and the latter is quite different from the consciousness of a dog on whom the same visual stimulus acts. Quality difference is a difference not expressible in terms of *more or less*: it is *difference of sort*. It is a distinctive characteristic of experience, due to the operation of a fundamental function of consciousness. All 'differences of sort,' whether among sensations or complex experiences, can be classed together, I believe, as manifestations of a single function; the alternative is to regard every quality difference as due to a separate function, which would require the presence of a countless number of functions in consciousness.

Intensity differences, which are expressible in terms of *more or less*, correspond rather closely to the differences that exist in the physical world. Increase and decrease is a mark common to both. And yet the parallel is not complete: quantitative changes in matter or energy arise always through addition or subtraction, while intensity changes in experience are 'internal' changes of the entire experience. The simplest instance of this modification is the rise of intensity differences in sensation, which may be almost if not quite unaccompanied by changes of quality. Usually the two processes coöperate. The

rise of memory and attention are examples of this: memory elements are of feebler intensity than sensations, but they possess also a peculiar quality of their own; attention results from the greater importance or 'bigness' of certain elements and a fading of others into 'subconsciousness,' but at the same time there is a quality change in the data, which we call 'vividness.' These examples indicate that intensity change is something fundamentally different from 'change of sort,' and must therefore be due to the operation of a distinct mental function. For convenience I will call the intensity function *Modification* and the quality function *Differentiation*.

A fourth factor in the development of consciousness is *Association*. The importance of this process, at least, has been recognized by psychologists; indeed, it will be recalled as the corner-stone of an early school. The mistake of these thinkers lay in over-emphasizing its rôle, or rather in their failure to appreciate the coördinate importance of other functions. Association requires the existence of two or more experiences at the same time, for even 'successive association' demands the simultaneous presence of the data at the instant of union. The experiences may be either simple or complex; but as the latter are themselves the result of association we have to consider the simple only in determining what is meant by the union of simultaneous experiences into a single state of consciousness. The physiological side offers no difficulty. Different neural centers, excited by stimuli from different parts of the same sense organ, or from different organs, are simultaneously active. These simultaneous physiological processes are brought together by activity in some connecting nerves, and the result is a complex activity. But the psychological standpoint will not allow us to substitute these terms for the processes of consciousness. The various elementary sensations have been accounted for by the functions of differentiation and modification; if two or more such elements occur simultaneously as *separate data*, they constitute 'split-off' portions of consciousness. Now, the union of such split-off or independent experiences into a single complex state can only be accounted for by the operation of a new function of consciousness; and it is to this that the term 'association' is applied.¹ The different forms of association that psychological analysis has discovered (fusion, integration, synthesis, etc.) depend on the nature of the par-

¹ The adoption of the term *association* instead of *combination* to denote the function has the sanction of the earliest usage, as instanced in the writings of the Associationists; see, however, the article 'Combination' in Baldwin's *Dictionary*, Vol. I., p. 198.

ticular data and on the manner of differentiation of the compound; the process of uniting the data is the same in all.

The simplest instance of association is found in complex sensations, in which simple experiences belonging to a single sense are united. Experiences, simple or complex, from different senses are combined into perceptions (or percepts) through the same operation. Memory elements are in like manner united, forming imagination images. Usually other functions coöperate with association. Thus the spatial character of perceptions is due to a particular sort of differentiation of certain of the data — the 'local signs.' Complex memory images, or 'memories,' are differentiations of perception — similar to the difference between memory elements and sensations. The division of experiences into presentations, feelings, and impulses rests, as already suggested, on the prominence of data from the external, systemic, and kinæsthetic senses, respectively, in the perception; this is a differentiation of sensation associations along three lines according to the character of the data. Further instances of coöperation are found in normal illusions: illusions of perception are borderline experiences between perception and memory, while illusions of memory are on the borderline between memory and imagination; in each case elements of the two classes are associated, with a new differentiation. Finally, emotions are associations of feelings and impulses.

The four functions so far discussed are sufficient to account for the phenomena of 'unreflective' mind. This includes both simple differentiated and complex states of consciousness. But the association of differentiated experiences — such as produces perception, for example — does not involve *recognition of differences* between the constituent elements. This fact of recognition, 'awareness of difference,' or reflection, is due to a further operation of consciousness, of a sort quite different from any of those already considered, which manifests itself relatively late in the course of mental evolution. To this function I would apply the name *Discrimination*, broadening the application of that term, though in line with its accepted meaning.¹ It constitutes the characteristic feature of both the judgment psychosis and the 'Unterschiedsempfindlichkeit' of experimental psychologists. It is the mark not only of judgment and belief, but of all reflection and self-consciousness. Whatever motor and systemic factors we may trace as its physiological concomitants, the act of discrimination itself is something purely mental, something without physical analogy. It results, as Brentano properly insists, in a new type of experience,

¹ As limited to *sense* discrimination; see Baldwin's *Dictionary*, Vol. I., p. 284.

which includes the data of perception, memory, and imagination among its constituents, but in which something new is added to these elements. The recognition of differences is not a mere quality change — it is a new sort of change in experience. And the function which produces it deserves quite as much study in systematic psychological analysis as any of the earlier ones.

The operation of discrimination upon perceptions produces apperceptions; where memories are concerned it produces concepts; where imagination images are concerned it produces ideas. As borderline phenomena between these classes of phenomena we find delusions. Meanings, rational beliefs, and values are particular kinds of differentiation of reflective data: in ordinary cases they are marginal elements attached (by association) to the reflective data; but by further discrimination on these marginal elements new reflective experiences arise. Thus, words and other associated symbolic elements constitute the basis of meaning; meaning itself is produced by a further reflective act on these associations. The traditions of formal logic have obscured the analysis of the 'rational processes.' Rational discrimination acts generally upon concepts, though apperceptions and 'free' ideas may also be its data. The associations which we call rational, whether simultaneous (logical 'judgment') or successive (reasoning), differ from the ordinary 'free' associations in being limited by the so-called 'laws of thought.' And this limitation signifies that those associations which reproduce in consciousness the 'consistent' workings of physical nature, have proved in the race history so much more self-consistent, so much further-reaching in the organization of presentative experiences, and so much more useful in their relation to the impulse complexes, that they have come to form a special type of associations. When discrimination appears this difference between 'rational' and 'free' associations comes to be recognized, and the added element transforms the unreflective rational associations into 'rational beliefs.' The rôle of discrimination in producing the consciousness of values can be traced in much the same way. The transformation of impulse into volition is also the result of discrimination. The imagination of an 'end' of activity may arise before the reflective stage — as an image similar to other images, but resulting physiologically in action which brings about the situation imagined, which situation, in turn, is accompanied by sensations similar to the 'end' image. But this is still impulsive consciousness; it is transformed into volition only when the end is discriminated from other images — that is, when it becomes a conscious 'purpose.' The transforma-

tion of feelings into sentiments can be similarly traced. Finally, the common character of all experience is picked out by an act of discrimination, giving the reflective experience of self, or self-consciousness.

To summarize. The five functions which I have mentioned — sensibility, modification, differentiation, association, and discrimination — are fundamental mental processes of different sorts which the data furnished by sensory and central stimuli undergo. Their working together has resulted in the evolution and development of consciousness into the many types and the multitude of complex forms found in human experience. Two of these functions — modification and association — are in a measure similar to phenomena of the material world; the other three are totally unlike anything outside of consciousness. I give in tabular form the relations between these fundamental functions and the principal classes of experience as indicated in the preceding discussion, following the genetic order of the latter :

TABLE.—SCHEME OF MENTAL FUNCTIONS AND EVOLUTION OF CONSCIOUSNESS.

	KINDS OF EXPERIENCE.	FUNCTIONS.
Unreflective.	First appearance, Continuum of experience (undifferentiated sensation).	by Sensibility.
	From this, Experiences of different degrees (sensations of varied intensities)	by Modification.
	From these, Experiences of different sorts (sensations of varied qualities)	by Differentiation.
	From these, Experiences duplicated (basis of space character), diversified (according to sense organ), attended to; memory elements	by same functions.
	From these, Complex sensations, perceptions, imagery	by Association.
	From these, Memories; presentations, feelings, impulses; normal illusions of perception, of memory; emotions.	by same functions.
Reflective.	From these, Apperceptions, concepts, ideas; delusions	by Discrimination.
	From these, Meanings, rational beliefs, values; volitions, sentiments; self-consciousness	by same functions.

If the main point of my contention be admitted, the distinction between *function* and *structure* in the generally accepted use of those terms seems of relatively small importance. Whether we deal with perception or percepts, memory process or memories, imagination or

images, does not affect our analysis. On the other hand, this view makes the *fundamental functions of consciousness* and the *kinds of experience* something quite distinct, requiring separate treatment in the psychological analysis.¹

I do not mean to belittle the physiological and physical data that 'underlie' sensations, nor the nervous processes that 'underlie' perception, volition, etc. I wish merely to show that the rise of any particular experience and its make-up as a datum of consciousness can be fully described in terms of certain fundamental mental functions, without recourse to neurological terms at all. Regarded from this standpoint, psychology involves physiology only as the latter involves physics and chemistry. The analysis of mental content in terms of essentially mental functions and the tracing of its growth in the same terms afford, I believe, the only solid basis upon which to build an independent natural science of psychology.

¹This résumé has necessarily been brief and rather dogmatic, and I am conscious of many obscurities and doubtful points. The main outline of the theory suggested itself some years ago and has stood the test of personal criticism in the meantime; it is offered here in a preliminary way for discussion, to determine whether it is worth following up.

PSYCHOLOGICAL LITERATURE.

MENTAL EVOLUTION.

The Hand in the Evolution of Mind. ROBERT MACDOUGALL.
Amer. Jour. of Psych., 1905, XVI., 232-242.

Individual variations in color, venation, texture of skin, plumpness, size and shape of the hand have given rise to recognizable types popularly connected with special aptitudes and temperaments. Specific variations of the organism are significant of specific mental correspondences. The body, as the instrument of the mind, and the mind, as the system of functions connected with a body, are not independent entities. The sensory and reactive mechanisms condition the character and range of experience and limit the evolution of intelligence more closely than does the elaboration of the nervous system. The development of the hand is of especial interest. The opposition of digits made possible superior types of manipulation and construction, while the ensuing mode of life called for higher mental activities. Beyond this point survival variations appear to be chiefly dependent upon central nervous organization, development consisting of increased facility and precision and of ingenious use of mechanical instruments. Structural development is not arrested. Cerebral development requires more sensitive and discriminative perception as well as the possibility of more delicate reaction. In the elaboration of the perceptual world sensory elements have meaning only by virtue of their union with definite reactions. Hence, mechanical limitations upon reaction determine the interpretation of sensory content. The functional superiority of one sense over another is due to difference of sensori-motor correlation. The associated activities are important in the interpretation of visual and auditory sensation as well as of tactful.

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Zur Frage der phylogenetischen, vikariierenden Ausbildung der Sinnesorgane. G. ALEXANDER. Zeitsch. f. Psychol. u. Physiol. d. Sinnesorg., 1905, XXXVIII., 24-33.

After a minute description of the details of her investigation, the author gives the following summary:

I. That the development of the ear in *Talpa Europea* and *Spalax*

typhus is remarkable is demonstrated by the relative size of the transverse section of the cochlea, the large number of sensory cells, and the size of the eighth nerve.

II. The sensory cells of the organ of Corti form, at intervals, four lateral ciliary rows at some distance from the pillars of Corti. To these come also an axis of ciliary cells so that five ciliary cells are situated in a radius.

III. In *Talpa Europea*, near the lower ampula and indeed in the sinus utricularis inferior, there is a macula neglecta which is not found in the rest of the higher mammals, is here shown for the first time in a higher mammal, and, with the exception of birds and reptiles, has been found only in one other of the lower mammals—*Echidna aculeata*.

IV. An excellent balancing, anatomically, is shown, in the case of both species investigated, in the unusual size of the terminal place of the nerves. In the case of the mole the balancing is shown also in the relative increase in the number of the sensory cells and a fold between furrow-like formations on the endolymphatic surface of the neuroepithelium.

V. The morphological transition of the labyrinth of the lower mammals into the higher is illustrated in the anatomical condition pointed out in III.

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CHILD PSYCHOLOGY.

Nouvelles méthodes de mesure applicables au degré d'instruction des élèves. V. VANNEY. Année psychol., 1905, XI., 146-162.

Notes sur l'éducation des enfants arriérées à l'école de la Salpêtrière. MEUSY. Année psychol., XI., 83-93.

Sur la nécessité d'établir un diagnostic scientifique des états inférieurs de l'intelligence. A. BINET et TH. SIMON. Année psychol., XI., 163-190.

Méthodes nouvelles pour le diagnostic du niveau intellectuel des anormaux. A. BINET et TH. SIMON. Année psychol., XI., 191-244.

Enquête sur le mode d'existence des sujets sortis d'une école d'arrièreées. A. BINET et TH. SIMON. Année psychol., XI., 137-145.

M. Vanney holds that age and the ability to read, write, and count are not adequate criteria for determining the school standing or amount of instruction received by the child. Appreciating this, the

author attempts to establish standards which should be met by the normal child during the seven primary school years between the ages of seven and thirteen inclusive. These standards, which represent degrees of knowledge, are very clearly specified. Normal children should have no difficulty in meeting these requirements, for in general they are very simple, and those who do so are making satisfactory progress. The needed help can be given the retarded or backward child, who, it is claimed, can be detected very readily by this scheme.

M. Meusy reports that about one hundred and fifty defective children are enrolled in the Salpêtrière. These children are grouped into four classes according to mental ability, not age. The lowest or fourth class is for the most part made up of partial paralytics. Effort is made to teach them simple songs, simple manual exercises, location of parts of the body, how to dress themselves, etc. Much stress is laid upon gymnastic exercises, and slight progress is made in writing and speaking.

Many of these children then become ready for the third class. Learning to write is a favorite occupation. Color and form are taught and simple drawings are made. The children learn to recognize animals and other objects. They are taught to pronounce correctly. Manual exercises and music occupy a large part of the time.

Ability to read and write admits to the second class. The rudiments of French history and geography are taught and very simple reading lessons given. Effort is made to teach something of the value of different coins and further acquaintance is made with surrounding objects. Memory is cultivated by easy lessons in grammar and by the multiplication tables.

Children of the first class compare favorably with normal primary children. Addition, subtraction and multiplication are rather easily learned, but division is very difficult. Imagination and judgment are lacking and the vocabulary is restricted.

Under the very careful instruction, many of the children succeed in earning certificates of study and a few even become self-supporting by means of some simple trade.

Binet and Simon point out, in their first-named article, that the diagnosis of the condition of mentally backward children is very difficult on account of the lack of a generally accepted scientific terminology. The same child has been called an imbecile by one physician, idiot by a second, feeble-minded by a third, and degenerate by a fourth. There are three potent causes for such disagreement: ignorance, variable meaning of terms, lack of care in observing the symptoms. In re-

sponse to the need several classifications have been attempted, usually either symptomatic or anatomico-pathological. Some of these are discussed. While the authors do not present an original classification, they state that the satisfactory one will be based upon clinical psychology.

The tests outlined in the second article by Binet and Simon are for the purpose of investigating the true physical and intellectual status of mentally deficient children. These tests are grouped under three general methods, the psychological, the pedagogical, and the medical.

1. *The Psychological Method.*—The problem is to measure the degree of intelligence. Repeated trials have led to the selection of the following tests, arranged in the order of increasing complexity: movements of regard; prehension following tactile stimulus; prehension following visual stimulus; recognition of food; procuring food by overcoming a slight mechanical difficulty; execution of simple orders and imitation of simple gestures; verbal recognition of objects; of pictures; naming designated objects; immediate comparison of two lines of different lengths; repetition of three numbers; comparison of two weights; suggestibility; verbal definition of known objects; repetition of fifteen-word sentences; stating differences among several known objects from memory; memory for pictures; reproduction of designs from memory; stating resemblances among several known objects from memory; comparison of lengths; arranging in order five weights; detection of gaps in weight series; rhyming words; supplying missing words; formation of sentence using three given words; answering abstract questions; telling time by inverting hands of watch; definition of abstract terms. The peculiar nature of the observers makes it necessary for the experimenter to exercise great care. Detailed directions are given for all the tests, and special caution is urged in overcoming the ordinary errors in methods of procedure.

2. *The Pedagogical Method.*—The investigation is made to determine the amount of knowledge actually acquired by defective, and to compare this with that acquired by normal children. Equal emphasis is placed upon knowledge acquired in the school room and out of it. The answers to an ordinary questionnaire and a few simple tests furnish the necessary data. No important new contribution is made.

3. *The Medical Method.*—Attention is directed to the discovery of anatomical, physiological and pathological causes and conditions of defective intelligence. Record is made of hereditary tendencies as age of parents at birth of child, alcoholism of parents, tuberculosis

and neuropathic affections in family, consanguinity of parents, order of birth of child in family, mortality of brothers and sisters; developmental irregularities as retarded dentition, walking and speaking; anatomical features as size, weight, shape of head; pathological conditions as adenoids, tuberculosis, rickets, syphilis, defective nutrition; and such other characteristics as the condition of organs of special sense, respiratory and circulatory functions, temperature, blood count, facial expression, etc.

The authors hold that these three methods, the psychological, the pedagogical and the medical, reveal respectively *certain*, *probable*, and *possible* indications of abnormal conditions. On the whole the article is suggestive, but it does not contain much that is really new.

The third article by Binet and Simon deals with the efficiency of the instruction given at the Salpêtrière as shown by the history of those leaving the institution. Information was obtained of one hundred and twenty persons leaving since 1900. The average time spent in the school was about seven years. The average age at leaving was eighteen. Epilepsy was by far the most common disorder, next in order being feeble-mindedness. Of the number given above, twenty persons were benefited, of whom twelve follow professions and eight have returned to their families. Twenty others returned home about whom further information was not obtainable. Sixty passed the age limit and were transferred. Seventeen died, and three so-called martyrs were really normal. Feeble-minded children and simple epileptics received the greatest benefit.

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A propos de la mesure de l'intelligence. A. BINET. Année Psychologique, 1905, XI., 69-82.

The title of this article is justified by a preliminary review of an attempt by Biervliet¹ to set up a measure of intelligence by visual and tactual tests and a consideration of the mean variation. In this Binet remarks on the noteworthy utterance that in the mean variation there is found a register of attention. He then proceeds to the consideration of the main question as to the best means of measuring intelligence, especially in schools, when such a measure is often required as a basis for further investigations. The method advocated, which, it is admitted, may not be altogether original, is that of the degree of instruction as determined by the school grade of the child. This method

¹*Journal de Psychologie*, I., p. 225.

gives more reliable information than is to be had from the personal estimates usually furnished by the instructor as the basis of psychological and pedagogical studies of children. The opinion that the relation between school grade and age gives a satisfactory means of measuring the mental status of the child is confirmed by experimental investigations in such widely divergent lines as memory and cephalometry.

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RACE PSYCHOLOGY.

Observations on the Senses of the Todas. W. H. R. RIVERS.

British Jr. of Psychol., 1906, I., 321-396.

The Todas of the Nilgire Hills in southern India are a small community of about 800 individuals. They are a race in which there has been no incentive to extraordinary development of the sensory powers, nor until recently have there been any causes at work to produce pathological changes in the sense organs.

The method of work was the same as that used in the Cambridge expedition to Torres Straits. The people came in groups of twos or threes to pass the morning in being tested, and ample time between tests was given each one to recover from ennui or fatigue. It was necessary to use an interpreter, but it is thought that this did not interfere with the work.

Visual Acuity. — The method of treating was to use a modification of the E-test devised by Cohn. Eighty-four men and boys were tested and fourteen women and girls. It was found that the average distance at which the letter E could be distinguished was 2.2 times the normal distance, according to the system in ordinary use. These figures show the Todas to have a somewhat higher average acuity than the inhabitants of Torres Straits and fewer subnormal cases.

Color-vision. — By means of Holmgren's wools the names of colors were obtained. It was found there were definite words for red and yellow, less definite nomenclature for green and blue; blue and black are often given the same name and there are no definite terms for brown or violet.

Color Discrimination. — Out of five hundred and three individuals, forty-three were color blind. They all show a tendency to discriminate greens, blues and violets less definitely than reds and yellows.

Color Thresholds. — Lovibond's tintometer was used for these experiments. The average of tests of forty-seven well show that the

threshold for red is slightly higher than that for yellow, but both are considerably lower than that for blue.

A comparative table of the color thresholds for five races — Todas, Uralis and Shalagas, Egyptians, Papuans and English — shows :

1. That the Todas have the highest thresholds for red and yellow. It is very much higher than that of the Papuans where red-green color blindness does not occur.

2. That the threshold for blue is higher than that of the English but lower than the other barbarous people.

Color Fields. — Small colored discs pasted on black grounds were passed from outside the field of vision to the point of fixation. It was found that in all cases the color fields were so small that they could not be differentiated.

Color Blindness. — 12.8 per cent. of the 503 men examined showed definite cases of red-green color blindness. This fact taken in connection with small size of the color fields suggests that in these individuals the red-green area has diminished until it has disappeared.

Visual Illusions. — Quantitative observations were made to ascertain the degree in which the Todas are subject to two geometrical-optical illusions; (1) the erroneous estimation of vertical as compared with horizontal lines and (2) the Müller-Lyer illusion.

The Illusions of Compound Horizontal and Vertical Lines. — The tests gave the following general results :

1. The illusion was greater when the horizontal was the variable line.

2. When the variable line is made equal by shortening it shows a greater length than when it is made equal by lengthening.

3. The observations with the two methods are fairly constant.

Similar observations were made on forty Englishmen, Cambridge graduates and undergraduates. Compared with the Todas they show a relatively slight illusion. With both Todas and Englishmen the illusion is greater by the first method.

The Müller-Lyer Illusion. — By means of an apparatus with a sliding board the figure was set until it seemed equal. It was found that the Toda sees the illusion in a greater degree than the Papuan and in a slightly smaller degree than the English observer. The explanation suggested is that the savage is less influenced by the figure as a whole. The fact that savage and civilized men react differently to these two illusions suggests a mere physiological explanation for the former, and a more psychological for the latter.

Tactile Discrimination. — The threshold for the discrimination

of two points on the skin was tested at three places by the method used by Mr. McDougall in Torres Straits. The results show the English less sensitive in the forearm, but more so on the nape of the neck and on the finger. Comparing all the data it is found that tactile discrimination increases with intellectual development. The same is true of sensibility to pain, which was tested by means of Catell's algometer.

Smell. — The method was to use different dilutions of a standard water solution of camphor. The results show that the English have a slightly better sensitivity than the Todas. Dr. Myers, however, found the Papuans slightly more sensitive.

Taste. — It was found that the Todas have words for the four pure taste sensations.

Conclusions. — The general conclusion which may be drawn from the available evidence is that pure sense acuity is much the same in all races in the absence of definite pathological conditions, and that the frequent superiority of the savage over civilized man in his recognition of what is going on around him in nature is due to his trained powers of observation.

However, the comparison of sense acuity in races of different culture is very much complicated by differences in the part played by inference in determining the sensory threshold. This factor plays little part in the determination of visual acuity, but has a marked influence on the determination of tactile acuity, and plays an even greater part in the determination of the acuity of smell. Its effect is always to lower the threshold, *i. e.*, to give to the individual an appearance of sensibility which is higher than he really possesses.

Dividing all the subjects into two groups, those above and those under thirty-five, it was found that age had a marked influence on two senses, sight and smell.

In the region of color vision, the most interesting feature of the Todas is the frequency of color blindness. The color nomenclature is especially defective in any adequate expression for blue, and associated with this is a defective sensibility for blue. They add therefore to the evidence that in lower races defective color nomenclature is due in part to defective sensibility.

An interesting result of the observations on illusions is the evidence that the processes involved in the tests are much simpler for the Toda than for the more civilized man. The results often came out more clearly and definitely in the case of the savage, because he attends simply to the matter to which he is asked to attend and is not troubled with speculations as to the why and wherefore.

In connection with the quantitative tests recorded, coefficients of variability are given. The comparison of variability in different races is complicated by several factors. In illusions, for instance, different individuals may vary: (1) in the degree to which they are subject to the illusion; (2) in the method of carrying out the test; (3) in the degree of care and attention which they give the observations; (4) in different degrees in which fatigue and practice make their effects felt.

In several of the measurements for which Papuans, Todas and Englishmen have been tested, the Todas are found to occupy a position between the other two. In general intellectual and cultural development the Todas undoubtedly occupy an intermediate position. This suggests that there is a connection between general intellectual development and such mental operations as are tested in these experiments. The evidence is, however, at present too scanty to establish this proposition.

ELIZABETH O'NEIL.

BRYN MAWR COLLEGE.

Acquisition of Written Language by Primitive Peoples. ALEXANDER F. CHAMBERLAIN. Amer. Jour. of Psychol., 1906, XVII., 69-80.

In this article a résumé is given of the attempts made, chiefly by missionaries, to instruct tribes of American Indians in writing their own tongues. The subject is treated primarily from the point of view of the methods by which the problem was approached, as a contribution to the psychology of language-learning, and includes the following tongues: Algonkian, Athapascan, Chinookan, Eskimoan, Iroquoian, Salishan and Siouan.

The difficulties which our missionaries have had in teaching primitive peoples some method of recording their language have led to all kinds of experiments, and it is peculiar to note that all successful results have been along the same line, viz., a kind of syllabic spelling.

For a language containing only the broad vowels and a limited number of consonants, a series of signs or marks to represent these vowels and consonants can readily be invented, as is shown by the many instances given in this article; and such a system of phonetic writing a child will learn within a few days, and often even within a few hours.

For a great many years the languages of some of the tribes in the Indian Territory have been written by a system of phonetic, or syllabic components, and a paper printed in this system has been published

by the General Council of the tribes and distributed free. It has been claimed that every Indian speaking the language in which it was published could read this paper, yet there were no schools in which they were given instructions in the writing. It was something that could be learned in a few days and they just picked it up. The writer does not know if this paper is published now, but in his travels in the Indian Territory he has frequently seen it and knows that it was published some fifteen years ago, and it is his belief that the superior civilization of the tribes mentioned is due largely to this educational influence.

We believe a little careful thought will lead us to see what a great difficulty confronts the child in learning to read by our present method of writing. Letters mean absolutely nothing to a child, and it is often months under the old system of learning to read before the child sees any application of them whatever, and so there is nothing to excite interest up to this time. Under the 'word method' a practical application is made at an earlier date, yet the difficulties of this method are great; and when we learn that an illiterate, half-breed Indian invented a system of syllabic spelling by means of which a child easily learns to read without any instruction whatever, it would seem to be a severe criticism on our 'advanced methods.'

A short bibliography is appended to the paper.

W. R. MILLER.

NEW YORK UNIVERSITY.

Primitive Hearing and 'Hearing Words.' ALEXANDER F. CHAMBERLAIN. Am. Journ. of Psychol., 1905, XVI., 119-130.

"In this essay an attempt is made to bring together certain facts of anthropological-psychological interest, not to exhaust a subject the investigation of which has hardly yet begun." The topics considered are : 'Acuteness of Hearing,' 'Deafness,' 'Ear and Hearing in Folklore and Mythology,' 'Ear-mindedness,' 'Noises, Musical Sounds, etc.,' and 'Onomatopœia.'

HUGH S. BUFFUM.

UNIVERSITY OF IOWA.

The Native Tribes of South-east Australia. A. W. HOWITT. London and New York, The Macmillan Company, 1904. Pp. 819.

The Northern Tribes of Central Australia. BALDWIN SPENCER and F. J. GILLEN. London and New York, The Macmillan Company, 1904. Pp. xvi + 784.

These volumes, while in the main confirming previous work of

their distinguished authors, are valuable for the social psychologist as throwing additional light on totemism and affording additional illustration of the intricate relations between group and individual involved in the classificatory system of relationships. As regards totemism, Spencer and Gillen find the belief in the re-incarnation of ancestors widely extended, and not confined to the few tribes studied in their former book. They find it present in tribes reckoning descent in the female, as well as in those reckoning it in the male line. The ingenious device by which the belief is combined with the custom in some tribes of always counting the child as belonging to the mother's totem, is worth noting. In this case it is held that the spirit selects only a woman of the right totem when about to re-incarnate itself. Both volumes testify that the conditions of utter brutality alleged to prevail in the treatment of the women are not found in the tribes known to them. The value of the initiation ceremonies in inculcating respect for the elders and the group is emphasized. The method for the change or transfer of customs through the conferences of old men and the mutual visitations, indicate that the imitation is deliberate. Ceremonies to increase the supply of the totem plant or animal are also found to be of wide extent. This is in the line, so far as Australia is concerned, of tracing totemism to economic sources.

Bushido, The Soul of Japan. INAZO NITTOBE. Philadelphia, Leeds and Biddle Company, 1900. Pp. 127.

Japan. An Interpretation. LAFCADIO HEARN. New York, Macmillan Company, 1905. Pp. 549.

These two books afford interesting material for the social psychologist by their exposition of one of the most remarkable instances in history of the extent to which a class-standard and a kinship-religion may impress and sustain the individual. The recent war has shown the effects of this influence. These books make the conduct of the Japanese Samurai intelligible. While Bushido is originally the standard of a class (literally Military-Knight-Ways), it nevertheless has an influence also upon lower classes as setting before them a standard for imitation. The leading characteristics of Bushido, rectitude or resolution, courage, benevolence, courtesy and veracity, all have their specific content modified by this class consciousness from which they derive.

Mr. Hearn's book emphasizes especially the religious bonds by which the Japanese is attached to family, to clan and to nation.

J. H. T.

INDIVIDUAL PSYCHOLOGY.

Psychologie de deux messies positivistes, Saint-Simon et Auguste Comte. GEORGES DUMAS. Paris, Alcan, 1905. Pp. 314.

The key to the lives of the two positivists is sought by the author in their belief that they were not merely philosophers but messiahs. They were not alone among their contemporaries in cherishing such a belief in a mission. Fourier, Enfantin, and others were in like manner convinced of their prophetic and messianic functions. The destructive criticism of the eighteenth century upon the old order gave an open field for the enthusiasts who had, as they believed, the gospel of a new religious and political dispensation to announce. Both Saint-Simon and Comte took themselves and their gospel seriously. Saint-Simon entitled himself the 'vicar of God on earth,' and Comte similarly styled himself *grand prêtre de l'humanité*. Both regarded it as their mission to restore the social and spiritual to its supremacy over the rationalistic and critical. Napoleon, although denounced by Comte, was really the living model for much of the messianic conception. If we use this messianic idea as the key, we can explain Saint-Simon's life without the supposition of insanity; or if it is claimed that at least there was a psychopathic temperament, it may be asked if such a temperament is not one of the biological conditions of the messianic passion. In the case of Comte we have to recognize also the strong influence of his passion for Mme. de Vaux.

The treatment of the thesis suggests that it may be difficult to draw the line between a consciousness which may, in any very significant sense, be called 'messianic,' and such a conviction of a 'mission' as inspires many a life. Is the difference one of degree of conviction, or of emotional fervor, or of complete absorption in the idea, or of a social milieu so permeated by sympathetic anticipation as to raise the whole consciousness to a unique attitude? M. Dumas has not attempted to answer such questions as these, but takes the messianic as a sufficiently well understood category.

J. H. T.

SOCIAL PSYCHOLOGY.

Primitive Traits in Religious Revivals; a Study in Mental and Social Evolution. FREDERICK MORGAN DAVENPORT. New York and London, Macmillan, 1905. Pp. xii + 323.

We have here a good account of a number of striking religious revivals in America and in Great Britain; an analysis of the character of those among whom such revivals are apt to occur, as well as of

those who are successful revivalists; and an estimate of the influence of the revival method upon religious and secular social development. The book is both scientific and practical; it not only makes an 'objective' study of revival phenomena, but would also give guidance to those who control our religious organizations.

The revivals here described are the snake-dance and 'shaker' epidemics among the American Indians, the endemic revivals among our negro population, the revivals among the Scotch-Irish in Kentucky in 1800 and in the 'old country' in 1859, the 'great awakening' in the American colonies under Edwards and Whitefield, the Wesleyan revival in England, and finally the revivals in what the author calls the 'transition period' in the United States, under Nettleton, Finney and Moody.

Revivals, according to Davenport, occur most readily among primitive peoples and among those classes of our more civilized communities whose primitive traits lie nearest the surface,—where there is 'nervous instability,' a ready suggestibility, with a free play of imagination and emotion, especially fear. Along with these there is a frequent tendency to sensory and motor automatisms, marked by a narrowing of the field of consciousness and the rise of secondary personalities. When the higher centers of inhibition are developed, reflection occurs and the impulsive processes are checked, and revival phenomena are less readily induced.

The author believes that the revival-method is falling into disuse, and the explanation of this he finds in the fact that large areas of the American population are becoming more civilized and less primitive. "They who are preaching a revival of old-time revivalism in the highly developed sections of America are fighting against the stars in their courses. Recurring tides of faith there may be for generations to come, but they will steadily change in character from those of the old régime. It will require a more rational method to win men in the modern age" (p. 213). He is discriminating in his final judgment as to the value of the revival. "Sometimes it has been a helpful result religiously to the individual. There are many who have dated their spiritual birthday from such an experience. But there are also many, the record of whom has not been so carefully kept, who have been spiritually injured for time if not for eternity by this process. And there is a grave social danger in such a method of training large elements in a population. The man who yields unquestioningly and uncritically to impassioned appeal in the crisis hour of his religious life will do it in the crisis hour of his political life. And this is the

vice of democracy" (p. 285 f.). He thinks that the use of the revival method has been of important influence in making church membership predominantly of women, women as a class being more susceptible to suggestion and emotional appeal. This is an interesting view, but it is probably incorrect, inasmuch as the attendance of women is greater than that of men in many churches which make no use whatever of revival methods. The author points out the remarkable collocation of revival and other forms of social eruption, in that the same counties of Kentucky which were the focus of the great religious excitement of 1800 have also been the scene of a disproportionately great number of lynchings in that state.

So that, in general, the position is taken that our need is for more reflection, for a strengthening of reason, rather than, with James, to throw distrust on all this and to favor the subliminal and instinctive channels of religious illumination. "The safer doctrine is that neither the passionate nor the rational is the channel of special supernatural communication, or else that both are, through a real though insensible union of divine influence with the human at the springs of action. It is a shallow religious philosophy that is able to trace the supernatural in the 'affections,' but cannot trace at least dawning divinity in the developing reason of mankind" (p. 274).

The book is admirable in many ways. It is perhaps marked by facility rather than by great power and depth. And there is at times a certain air of intellectual satisfaction and repose in the presence of intellectual conceptions that are vague and in need of more critical handling. To take a single instance, 'nervous instability,' as a characteristic of primitive persons, is made much of, without any analysis of its great variety of contents so as to show in what respect the nervous system of primitive man is less stable than that of civilized beings, and in what respect it is not. The presence of intellectual inhibition, which at another point is made a chief mark of civilized man, is hardly equivalent to nervous stability in general. It goes with a high degree of nervous instability of a certain sort. The conservative strain in the primitive man and in the childhood of civilized beings,—the strong opposition to many forms of innovation,—should certainly be taken into account before we can, without more ado, mark the lower stage as unqualifiedly less stable.

But in dealing with a topic where partizan feeling, either of the anti-scientific or anti-religious kind, is so ready to appear, we must commend the author's balance and discretion. The book should prove helpful to readers of quite contrasted training and sympathies.

JOHNS HOPKINS UNIVERSITY.

G. M. STRATTON.

PLAY.

The Psychology and Philosophy of Play (I.). W. H. WINCH.
Mind, 1906, XV., 32-52.

This paper deals with the standpoints from which the subject may be regarded, followed by a discussion of the Psychology of Play. The latter is treated under four heads, viz., Imagination and Perception, Reality and Fiction, Play in Language, Play in Art.

Regarding the standpoints from which definitions of play have been made, the writer declares that the word play has not escaped those variations which occur in classifications of science. We must distinguish between the psychological and philosophical standpoints. Psychology is individualistic, philosophy aims at general conditions. According to Professor Groos, 'the essential point in the definition of play is its quality of practice or preparation.' This is a philosophical rather than a psychological definition. The game is played for itself and for no other end.

Of Froebel's assertion, 'Play is the purest activity of man at this stage (childhood) and at the same time typical of human life as a whole,' the writer questions the justification. He holds Professor Groos's conception of play to be only partially true, and to be dangerous as applied to educational practice.

Professor Groos's view of play regarded teleologically may be compared with the biological view that 'play is a functioning of the immature organs subserving the life functions of the adult.' This doctrine, he observes, is in contrast with the recapitulation theory — the father's work has become the children's play.

From the individualistic standpoint it may be said, first, that those activities are playful which are performed for the sake of the game; second, that insofar as the conscious acquisition of skill in the game or anything else is present, the mental attitude ceases to be purely playful; and third, that the plays of life are more or less dissociated from the great body of beliefs and actions which make up the conception of our real world. Further than this, however, we cannot go without difficulties.

Adult play manifests the characteristics which the word implies more definitely than youthful play, and is more clearly dissociated from practical needs. As life advances we know better what is play and what is work.

The writer takes exception to Groos's affirmation that 'the feeling of pleasure that results from the satisfaction of instinct is the primary

psychic accompaniment of play,' since the game is for its own sake and not for the sake of pleasure. Work is often pleasurable and play is not always so. That energetic action is in itself a source of pleasure (Groos) is an insufficient distinction, for all play is not energetic and much work is. Groos lays stress on the fact that success in play brings joy, but so does success in work; and this criterion of play does not distinguish it from other activities with which it is often contrasted. In short, it is impossible in childhood to distinguish play from serious activities.

In discussing Imagination and Perception in Play, the writer calls attention to the erroneous tendency to look upon 'sensation' as depending entirely upon external objects, and to ignore the fact that sensation is not a 'fixed absolute' and that perceptive judgments may be false. Professor Sully holds perception to be a compound of sensation and ideation, and says 'it is no less true that imagination in an active constructive form takes part in the very making of what we term sense-experience.' The writer doubts if this be justifiable, and asks, 'must we not suppose that perceptual cognition is prior to imagination?' and, 'are not children's play perceptions the result of lack of distinction?'

Mr. Winch assents to Professor Sully's supposition that color hearing and like phenomena showing themselves after childhood are survivals of early and fanciful brain-work, and says that the child's mind confuses imagination with perception, image with sensation, and in regard to the 'vividness of the images in color hearing,' he prefers to suppose that the sound stimulus has a direct effect upon color vision without the intervention of images at all, this view harmonizing better with our ideas of biological development than the diminished adult view of early life. The point is, says Mr. Winch, that the elements of the sensational complex modify each other.

Under his second division the writer attacks the tradition that 'the characters of early history were a series of mental syntheses personified by the imagination.' Uncritical anthropology usually told of the marvelous imagination of primitive peoples. Historical criticism and recent anthropology alike reach conclusions adverse to this belief. Dr. Stout asserts that 'primitive beliefs are nearly all relevant to the narrow circle of the savage's practical interests.' Any mental association of objects leads to a belief in a real connection, and this is not imagination pretending a connection in which it does not believe, for the connection is antecedent to imagination. When imagination and perception are differentiated, such connections are beginning to dissolve. A period intervenes where 'dissolution detaches what we

thereafter call superstition from the main body of belief, and these superstitions cease to be real and become play, fiction, art.'

"We must beware," says Hartland, "of crediting the story-teller with that decree of conscious art which is only possible in an advanced culture and under literary influences. Indeed research goes to show that story-telling is an inevitable and wholly unconscious growth probably arising out of narratives believed to record actual events." Thus, in the words of Stout, "What may be a transient play of imagination in the civilized mind is the permanent and serious attitude of the savage mind." These beliefs are found in children, and are irrelevant to the practical activities of life. Instead of being a preparation for serious views of life the proper work of education is to destroy them.

Two problems are suggested for consideration in the third division of the article, viz., Is play-language atavistic? and, To what extent will children acquire language spontaneously and by play? To the first question the writer answers, Yes. In play we find 'such interjectional utterance and distinction as we find lower down in the evolutionary scale of language.' To the second question he replies that the power of individualism in the theory of education to-day is dangerously approximate to the idea that every child should invent his own language. The writer objects to the 'purposely false nomenclature' which the present system demands, and says that Kindergarten names are rarely spontaneously applied, and when used in class do not remain with the Kindergarten object but are used to designate objects in daily life. Such a system is to be condemned because it pretends to a spontaneity which it lacks, and because the method hinders rather than furthers the learning of the language of life.

After recognizing the connection of art with the play impulse, the writer, in the fourth part of his paper, passes on to consider the development of art, as an aid to the discussion of the play impulse. Professor Haddon maintains that 'the most of artistic expression owes its birth to realism.' Papuan drawings represent parts of figures which cannot be seen, and children draw in the same way — what is, rather than what can be seen — two eyes in a profile sketch, for instance. The child may imagine that he can see both eyes, or he may confuse what he knows with what he sees : the second solution is more likely. Again, children, as Professor Sully says, are oblivious of dress and will draw the form before the dress. Savages draw the same way. The explanation is that the child and the savage draw what they know rather than what they see. In conclusion the writer insists that the child must be taught to distinguish what he sees from what he knows.

Professor Sully thinks that the visual image is correct, but the child is not able to draw his image, has no power over his movements. To this Mr. Winch objects, urging that 'the power to see is the result of a long and difficult analytical process.' And he finds in children's spontaneous drawings the same characteristics as appear in their inventive language.

B. G. DEMAREST.

NEW YORK UNIVERSITY.

DREAMS.

The Psychology of Dreams. JAMES RALPH JEWELL. Am. J. of Psychol., 1905, XVI., 1-35.

The material for this study was gathered by means of a questionnaire sent to normal schools, both teachers and pupils being requested to furnish data. In all, about eight hundred persons responded and about two thousand dreams were available for the investigation.

The deductions of the author are based, for the most part, on an examination of the dreams narrated rather than on the subject's own analysis of his dreaming states. The most important results obtained group themselves about the general topics: the causes of dreams, the logical character of dreams, their emotional and moral tone, and their confusion with reality.

The causes are found to be two kinds, physical and psychic. Of physical causes there are two distinct classes: (1) stimuli from the outside world on the end organs of sense, and (2) organic and muscular sensations. Of the psychic causes there are, likewise, two: (1) memory and association, and (2) suggestion.

In regard to the question as to whether judgment is active or in abeyance during dreams, Mr. Jewell finds that at times the train of thought of the dreamer is entirely logical.

In proof, cases are cited in which sleeping persons carry on perfectly rational and coherent conversation with persons awake and solve difficult problems; further, in those instances in which the dreamer knows while dreaming that he is dreaming.

The writer finds that most dreams are attended by emotion of some sort; it may be the emotion that would regularly attend the event in life or it may be quite the opposite. The dreams of childhood are characterized by the emotion of fear, but among adults the emotions seem to be about as complicated and various as in the waking state. Highly emotional dreams are not confined to any age, sex nor locality, though they seem to be most frequent in early childhood, puberty, and from eighteen to twenty-one years of age.

Half the persons answering the questions say that their dreams tend to repeat the undercurrents of their waking emotional life. Others say that dream emotions are just the opposite of those which would attend the actual event.

One of the things most clearly shown by the returns is that children almost universally and adults frequently confuse their dreams with real life. The cause of the confusion in childhood probably arises from the extreme credulity of children and from their limited memory store. The author points a moral in this connection, to the effect that what is often considered wilful falsehood among children and so punished, may be an honest confusion of a dream experience with a real event.

Moral tone in dreams seems to find no place until the tenth year. About this age the dreams of the night seem first to fashion themselves into punishments for the offences of the day. In childhood, the evil is apt to come in the form of the death of the child himself, the calamity is personal; later, the dreamed injury comes more often to friends and relatives. Such dreams may exert a very strong influence over the dreamer, even to the extent of complete inhibition of the wrong act.

In regard to the influences of dreams, there is considerable diversity. A large number say that they are not influenced by their dreams, others frankly admit that their mood and many of their acts for several hours after awakening are determined to a very appreciable extent by their dreams, particularly by the dreams of a highly emotional character.

The author is of the opinion that dreams have in the past played a far more important rôle in history than has been assigned them. The modern scientific attitude which seeks causes in natural phenomena, rather than in supernatural realms, has, of course, robbed dreams of much of their importance and influence.

While the above are the main points made by Mr. Jewell a number of interesting minor ones are suggested. Among these are the following:

1. Dreams may be prevented by suggestion and probably disappear just in proportion as the suggestion is complete.
2. Neither the season, day of week, nor the month has any noticeable effect on dreams, except for local setting, such as winter scenery being more common among the winter months.
3. Motor activity during sleep is distinctively a childish characteristic, though it often persists into adolescence and sometimes well into adult life.

4. Dreams differ markedly with respect to age and locality, and probably with respect to nationality as well.

5. Children dream of the events causing their great emotions very soon after their occurrence. * * * During later adolescence and adult life, the more importance an event assumes to the individual, as a general rule, the greater the length of time between its occurrence and its appearance in dreams.

6. There may be subconsciously injected into one's dreams an element of truth which he does not recognize as subjective, hence they may take on a supernatural cast.

GENEVIEVE SAVAGE MANCHESTER.

UNIVERSITY OF CALIFORNIA.

BOOKS RECEIVED FROM JUNE 5 TO JULY 5.

Physiologie et psychologie de l'attention. J. P. NAYRAC. Pref. by TH. RIBOT. Paris, Alcan, 1906. Pp. xii + 222. Fr. 3.75.

L'année philosophique, 16e année, 1905. Ed. by F. PILLOU. Paris, Alcan, 1906. Pp. 304. Fr. 5.

The Development of Symbolic Logic. A. T. SHEARMAN. London, Williams & Norgate, 1906. Pp. xi + 242. 5/- net.

Leitfaden der Psychologie. TH. LIPPS. 2. Aufl. Leipzig, Engelmann, 1906. Pp. viii + 360. M. 9.

The Psychology of Association. F. ARNOLD. (Columbia Univ. Contr. to Philos. and Psychol.) New York, Science Press, 1906. Pp. v + 80.

The School and its Life. A Brief Discussion of the Principles of School Management and Organization. CHARLES B. GILBERT. New York, Boston and Chicago, Silver, Burdett & Co. (1906). Pp. viii + 259.

NOTES AND NEWS.

EDWIN DILLER STARBUCK, Ph.D., professor of education in Earlham College, Richmond, Ind., has been elected to the professorship of philosophy in the State University of Iowa.

AT a recent meeting of the board of regents of the State University of Iowa, the name of the department of philosophy was changed to *philosophy and psychology*. Dr. Daniel Starch has been elected instructor in philosophy and psychology at this university.

PROFESSOR IRVING KING, of Pratt Institute, Brooklyn, has been appointed assistant professor of education in the University of Michigan.

THE following items are taken from the press:

DR. KARL ROBERT EDOUARD VON HARTMANN, author of 'Die Philosophie des Unbewussten' and other philosophical works, died at Berlin on June 6, at the age of sixty-four years.

IT is also reported that André Godfernaux, author of 'Le sentiment et la pensée,' died recently at Cannes. His recent writings were largely on the psychology of religion.

M. PIERRE JANET, professor of experimental psychology in the Collège de France, has been appointed lecturer at Harvard University next year and will give a course on the symptoms of hysteria.

DR. W. H. R. RIVERS delivered the Croonian lectures before the Royal College of Physicians of London on June 12-21, the subject being the action of drugs on fatigue.

DR. VIVIAN A. C. HENMON has been appointed lecturer in psychology at Barnard College, Columbia University.

AN independent lectureship in general and experimental psychology has been established at the University of Edinburgh in connection with the philosophical department. An appointment will be made in time to begin work next session.

IT is reported that a general institute of psychology is to be established in Paris at an early date, to be devoted largely to the study of phenomena of subconsciousness, the causes of criminality, and means of combating social evils.

